

DEPARTMENT OF DEFENSE BLOGGERS ROUNDTABLE WITH ALI ALLAK, U.S. ARMY CORPS OF ENGINEERS; MAJOR TIMOTHY SMITH, U.S. ARMY CORP OF ENGINEERS; JOHN OFFEN, U.S. ARMY CORPS OF ENGINEERS (VIA TELECONFERENCE FROM IRAQ) SUBJECT: ARMY INITIATIVES IN THE USE OF SOLAR POWER IN IRAQ TIME: 11:00 A.M. EST DATE: THURSDAY, DECEMBER 11, 2008

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LINDY KYZER (Army Public Affairs): Well, my clock just turned to 11:00 a.m., so we'll go ahead and get started. Again, this is Lindy Kyzer with Army Public Affairs.

I'm very excited for the topic of this panel. We have several very well-informed folks from the Army Corps of Engineers who are on the line here with us to discuss solar energy projects and initiatives taking place over in Iraq.

So without further ado, I'll turn it over to the experts for their opening remarks. For those of you who are on the line, just remember to press your mute buttons and then, after a few minutes of opening remarks, we'll turn it over to your questions. I'm not sure who wants to begin, Major Smith or Dr. Allak or whoever it is, but go ahead. You can jump in and get started.

Let's start with Dr. Allak.

MR. ALLAK: Yeah, thank you for your introduction, and good morning, everybody. I hope everybody's well.

There are various methods of harnessing solar energy -- photovoltaic cells, and these are the ones that -- these are the panels that convert the visible spectrum of the sunrays into electricity. They have a wide range of application, anything from solar street lighting to -- and this -- at the moment, air conditioning units and many other applications.

The other one is to harness and to connect the heat part of the sun spectrum, which is the infrared rays, and these are primarily used for heating water for a domestic system or sometimes for an industrial, where they can be used to generate electricity by thermal power stations.

In Iraq, there are particularly concerns -- and use at the moment is with solar street lighting, because this is a very convenient way. The technology and the method is available. It is relatively inexpensive. It's free of fossil fuels, free of wire connections, and I think there's a great deal of concentration at the moment in Iraq in using solar street lighting. But I

have to say, it's not to the exclusion -- there are other applications, and we can discuss that later on.

Advancement in solar energy technologies. At the moment, the photovoltaic cells have an efficiency of between 16 (percent) and 20 percent at best. There are -- (inaudible) -- carried on in various parts of the United States, and they can get up to -- by concentrating the sunlight onto the solar panels, there are -- more could be done in the United States, where an efficiency of 40 percent -- 40.7 (percent), to be precise -- has been achieved. And if that was to be commercialized, then obviously solar power and solar energy would become highly competitive and highly economical.

How much does solar -- how much does a watt of solar light cost? Well, at the moment, the figures are \$4 per watt. That's the cost of installation. A conventional system, optimistically -- people talk about a thermal plant using fossil fuels would normally cost about \$1 to 1-and-a-half dollars per watt. Obviously there is a great deal of -- well, there's a difference in the initial cost.

But at some point, the (curve ?) crosses and the cost of producing electricity by solar energy becomes viable if one takes into consideration that they are maintenance-free. There are no moving parts in a solar panel and there are no need for any fossil fuel. And it's virtually maintenance free. And if you take the cost over a period of years, the cost of solar panel becomes cost-effective in comparison with the fossil fuels, not to mention the environmental aspect, which is -- at the moment it's everybody's concern.

And I think, with that, I finish my opening remark. And obviously I'm quite happy to answer any questions put to me. Thank you for that.

MS. KYZER: Okay, thank you very much, sir.

Major Smith, did you have any opening remarks?

MAJ. SMITH: I don't have anything specifically. I did want to introduce two guys that are with me here tonight, and that is my resident engineer, John Offen, and the project engineer for our solar light project, Scott --

MR. OFFEN: (Inaudible.)

MAJ. SMITH: There you go. And, you know, as far as we're involved is actually the implementation of solar lighting in the city of Fallujah and Kharmah and Sakalaweyah. And I'll be glad to answer any questions you guys may have regarding that matter.

MS. KYZER: Okay, great. We'll go ahead and turn it over to questions.

Todd, did you have a question?

Q Yeah. So can you explain to me the different types of projects that are going on in Iraq right now that are using solar, and why solar?

DR. ALLAK: Well, obviously, at the moment, electricity in Iraq is not what it should be, and so solar as an (acoupmnt ?) is readily available. It's cost-effective. And it can be bought and sold in a matter of days.

There are companies at the moment in Iraq who assemble solar panel street lighting, and they are investigating other aspects of solar use, photovoltaic cells, photovoltaic solar cells. And it's convenient when it comes to remote areas where it's difficult to produce electricity or set up electrical plants. These units can be readily installed. They are available. They are commercially viable. And this is why everybody is -- (inaudible).

In addition to that, they are looking at, for instance, the use of solar energy to extract water from water wells, using submersible pumps. That's one application that some companies are experimenting with. And another application is the company is experimenting with partial air conditioning units where it use 50 percent of the electricity and 50 percent of solar panels generate electricity generated by solar panels. We're at the moment looking at an upgrade residential package to be used in the average Iraqi household. And I can explain that a little bit further if you so wish. But these are the main reasons that solar panels or solar energy has been used in Iraq, not to mention people are still aware of the pollution and the environmental situation, but that's a secondary aspect at the moment. It's the lack of electricity that is causing the use of solar panels for generating electricity.

MS. KYZER: Great. And Chuck, did you have a question?

Q Yes, I did.

The -- Nellis Air Force Base just recently added about 70,000 solar panels, and they're generating in the neighborhood of 14 megawatts of electricity into the local grid there. But the thought occurred to me, having parked my car on the street recently, that you get a lot of dust and a lot of materiel precipitating out of the atmosphere.

How do you go about ensuring the continuing efficiency of the photovoltaic cells, you know, in open atmosphere? And do you have problems with the dust, the sand storms and stuff, scratching the surface and degrading the efficiency?

MR. ALLAK: Thank you. This question is very often asked, and people say, "What happens in a dust storm in Iraq?" Suffice it to say that Iraq has approximately 360 -- (inaudible) -- probably 350 days of sunlight.

And we have, on average, one kilowatt per square meter of energy, sun energy, that lands in Iraq.

Maintenance, it's a problem. Whatever system you choose, maintenance has to be part of that system. The difference between the conventional power generation system, whether it's a gas power generation or it's a thermal power generation, you have mechanically moving items. You have a turbine that's moving at a high velocity. You're burning fuel in a boiler of some description. These will require maintenance on a regular basis, and they are expensive maintenance. And in addition to that, you've going to (charge ?) the cost of the fuel.

The maintenance for the photovoltaic cell is just to clean them. And -- there are no moving parts. And once you have sold them, that's all you really need to do. Maintenance has to be part of any system that you use, and that can only be a good thing, because we need to increase the employment in Iraq and possibly maintenance may not be a bad thing. But they do need to be maintained and they do need to be kept clean and they do need to make sure that they are

efficiently working. So, yes, maintenance will have to be part, but it's not an expensive part.

Q Thank you.

MR. ALLAK: Thank you.

MS. KYZER: Great. And we did have a couple of questions come in from folks via e-mail, so I wanted to take some time to get to those as we go through our rotation. Alan Boyle, who writes for Cosmic Log on MSNBC, wanted to know if any innovation developed for the applications in Iraq could be fed back into civilian use of solar power.

MR. ALLAK: Well, innovation is -- forgive me; this may be the wrong terminology -- development. There are a lot of companies who are developing systems for Iraq. As I said, one of the works that we are -- one of the systems that we are working on is an upgrade for the residential system. This is an independent system that can be installed in every household. The system that we are opting for will give 2.68 kilowatts of energy, and that translates in Iraq at the moment -- everybody talks in terms of amperes. That translates to about 12 (hours ?), which should satisfy most of the needs of an average Iraqi household.

This will not, obviously, operate an air conditioning system, but it will operate -- (inaudible) -- cooler. It will operate a ceiling fan. It will operate the television or the lights when necessary, the washing machine, et cetera. And we feel that if we can install the system in Iraqi homes, that will at least take the pressure off the grid. It will give some form of comfort to the average Iraqi family. And one needs to think of it like that.

If we were to install 100,000 or 200,000 of these units -- and you can work out the math -- we are talking about a large-scale power plant. But in this particular case, it's a power plant that is -- well it's maintained by the people who own the individual units. It's virtually vandal-proof because you can't go exploding every house in the country. It's virtually (difficult ?). And it will give -- it will liberate the average Iraqi from having to source out diesel or petrol, et cetera.

The cost of these units, we anticipate, should be somewhere in the region of \$15,000, which should be a figure that can be borrowed from a bank on a soft loan. And the repayments -- we worked out the repayment to be somewhere in the region of 200 (pounds ?) -- per month.

We often hear that the Iraqi individual or the Iraqi household don't pay for electricity. That is not altogether true. They do pay through the street generators and they do pay through purchasing diesel and gasoline for their own generators. And asking around, they pay in the region of \$200 per month. So if you can give them a system that is convenient, that is fuel-free, that is available 24 hours for them, I think they will be more than happy to buy the system and possibly pay the 200 (pounds ?) or something in that region. I mean, don't quote me on these figures. These are just approximate figures.

And this is what we try to promote and this is what we try to work on. And this is the sort of development that we are looking at and we're trying to implement, and this is the sort of development that we want to encourage people to use solar energy for.

MS. KYZER: Okay. And I'm not going to hog the time, but I have one more question via e-mail that I want to get to as well. Andrew Bachman from DOD Energy Blog wanted to know if there are examples where solar installs have displaced small oil or diesel generation, and if you can quantify diesel savings in any capacity. So if you could address that.

I also don't want to neglect Major Smith and his team, so feel free to jump in and step on top any time if you have something to contribute here. Thanks. MR. ALLAK: Well, thank you. Any solar installation inevitably will liberate some of the grids to be used for domestic. At the moment, the question is not whether we can replace solar energy with fossil fuel. At the moment we're trying to get sufficient electricity for Iraq. And once we do that, then we can look at replacing the fossil fuel with solar energy.

But the system that I've described will be able to help in that direction. But at the moment the priority is to generate sufficient electricity for the average Iraqi household so that normal living can be established once again.

MS. KYZER: Great.

And we'll go back down the line again. Todd, did you have a question?

Q Yeah, I'm curious, in some nations where they don't have a telecommunications infrastructure with copper running to every home, it's proven cheaper to install cell phones for everybody -- just build cell phone towers. And so that's a way to reduce costs in installing an infrastructure.

And I'm not entirely sure what the electricity infrastructure is in Iraq, but I wonder if you were going to build a Western-style industrialized nation electric infrastructure in Iraq -- where you had copper running to every home; you had generators that could power the entire country -- what would the cost of that be, to give Iraqis 24-hour power in every home, compared to giving power to every home via solar? Is that something that can be considered when you decide on costs?

MR. ALLAK: Yeah, I think it's not one or the other. I think it has to be a combination of both. The -- as an indication, if we were going to rely solely on solar power, rather than the fossil fuel system, then the percentage is 2-to-1, or 3-to-1. But the solar panel will be more expensive by a factor of 2 to 3 than the fossil fuel one.

But that is at the initial stage; this is at the initial installation stage. If we then take into consideration the running costs -- i.e., the maintenance and the fossil fuels that are needed, and the inconvenience of the transmission line, et cetera, I think at some point there's a payoff period. And that varies from one country to another, depending on manpower -- you know, the cost of manpower and the cost of fossil fuels and the cost of infrastructure, the -- how developed the infrastructure is.

But at the moment, in Iraq, the question is not that. The question is -- we need both. And I think we need to work on both. I think we need to make sure that the Ministry of Electricity have the -- they have fantastic plans, and they should be -- they now are in the process of implementing them. But also we need to look at short-term solution, and this is a short-term solution. Now, somebody might ask why do I want to pay a certain amount of dollars if the situation is going to be resolved. Well, the simple answer to that -- and this

is -- applies in the developed countries, is that once you gen -- you can subsidize your generation from the grid by using the power, but more than that, you can link the photovoltaic cell of the electricity you generate from the photovoltaic cell to the grid. And then that could be deducted -- the amount of electricity you supply to the grid can be deducted from the amount of electricity you consume.

That way, even the ones -- even the systems that are installed now, or will be in the foreseeable future, will have a lifetime of 15, 20, 25 years. So they will subsidize -- eventually, they will subsidize the household, they will subsidize the electricity of the household.

The advantage of the link into the grid is that you eliminate the need for storage for these -- (inaudible) -- batteries. The system basically works on a photovoltaic cell, which then charges batteries, and the batteries then supply electricity to the household. And by linking it to the grid directly you eliminate an expensive part of the system, which is the batteries.

But this is something that will happen when the electricity is stable, and we have a stable grid. And, indeed, this is happening all over Europe. And, as we know, Europe is quite full with electricity. But we are talking -- after we fulfill our requirements of electricity, we can then look at the environmental issues and other issues. And this is what I think is happening and should be happening.

MS. KYZER: Great.

And, Chuck, did you have another question?

Q Yes, I did. This is for Major Smith.

First of all, what type of lighting is being installed? Are we talking tungsten, LED?

And then could you characterize the changes that you're seeing from the installation of public lighting -- how it affects the neighborhoods where they're being installed?

MR. OFFEN: Hello, this is John Offen at the resident office here in Fallujah. The lights that we installed have an 80-watt panel on them, a lead-acid battery and a 18-watt fluorescent light bulb on them.

We've been, to date -- you know, we're right in the middle of the program. To date, we've installed about a little over 800 of them, and they're operating just fine. And we still have about 6 (hundred) or 700 more to go.

The reason they were installed is because of the -- the thing that's the only problem with the electrical grid that we've had so far -- the City of Fallujah didn't have power at night and this was an easy way to light up the streets that didn't depend upon any remote source of power. That -- then the Marines could feel a little more safer with doing their patrols at night. The Marines actually paid for these solar panels

As far as getting any feedback from the city to see if there's been a noticeable improvement in the safety and security, we don't have that direct information but the level of violence, the level of bad activity had definitely

been on the decrease -- whether that's related to the solar panels or not, we're not really sure.

Q Okay, let me -- I'm just typing as fast as I could, but I may have missed something. The battery is a lead-acid battery?

MR. OFFEN: Yeah, very simple, run-of-the-mill lead-acid battery.

Q Like a car battery?

MR. OFFEN: Yes, sir.

Q Okay. And then what was the fluorescent bulb -- how many watts?
MR. OFFEN: Eighteen watts.

Q All right, thank you.

MS. KYZER: Okay, great.

Q

MS. KYZER: Go ahead? (No response.)

Sorry, is there anyone else on the line who hasn't asked a question yet? I know it sounded like we had a couple of beeps mid-call, so I want to make sure I'm not neglecting anyone who's on the line and who has a question?

(No response.)

MS. KYZER: Okay, if not I have one more -- another question from e-mail again. It's Alan Boyle with Cosmic Log -- Blog, on MSNBC.

He wants to know, "About a year ago a group at the Pentagon issued a report talking about the possibility of using a space-based solar power system to provide beamed electrical power for use in battlefield conditions. Has there been any serious thought about this as a future option?" I know it's not exactly the scope of this call, so if you don't have an awareness of that, but if anyone has a knowledge of that, and has anything to say about that report, that was his question.

MS. : Lindy, I believe that's out of our league.

MS. KYZER: (Laughs.) Okay, I'll take that.

I sounded interesting, so, by golly, I wanted to know if somebody did.

MS. : (Laughs.)

MS. KYZER: I have one more question from Andrew Bachman, and then I'll turn it over.

Wanted to know if there was any -- related back to the other question, but wants to know how difficult it is for commanders, soldiers, airmen to get their hands on the solar equipment. Is it a part of a general package that's going to FOBs, or is it automatically sent? I guess, kind of the general, is a -- can individual soldiers or folks over there request this solar equipment, or is it being sent to targeted areas, or how is it being distributed?

MR. ALLAK: I think Major Smith should be able to talk to that better than I can. MAJ. SMITH: Right now, it's all being done by a contract through the Marine Corps, where they want the lighting placed. Individual airmen and Marines are not obtaining the lighting at all, if that's your question.

Q Lindy, I don't -- I don't think we're putting solar in FOBs. I think -- this here, we're talking about civilian installs.

MS. KYZER: Okay. Like I said, I just wanted to -- just wanted to ask the question as far as how it was being -- how it's being packaged and sent. And I think you clarified it with a -- it's a contract through the Marine Corps. It's not being sent across the board to FOBs for soldiers to place. It's a part of a contracted support effort. And I'll stop asking the questions, I promise.

And we'll go back -- Todd, do you have another question as we end?

Q Yeah. I'm hearing two things about solar here. One, we're installing street lights in cities so that at nighttime there's safety, security on the streets; and the other one is the doctor was talking about installing individual packages in Iraqi homes to provide them with power.

So I guess my question is, overall, in Iraq how many different types of setups have been installed in the various configurations for solar? How many street lights have been done throughout Iraq? How many civilian homes have been wired for solar power -- or will be, or are planned to be wired for solar?

MR. ALLAK: Well, as far as the street lighting is concerned, the Ministry of Electricity is the main contractor. And I believe they already installed 5,000 throughout Baghdad, and there's another plan for a further 3,000 to be installed in major areas, and main streets -- primarily in main streets.

It's interesting to note, at this stage, that the company who was contracted to the Ministry of Electricity have developed a new, more powerful lighting which is dedicated for Hai Street(ph). The ones that so far been installing has a 60-watt -- 66-watt output, and they're using -- I think somebody asked about the type of bulb they use. In this particular case they use low-pressure sodium lighting -- sodium bulb, low-pressure sodium bulbs.

And now they developed a 91-watt, which is much brighter. And we've managed to obtain two of these samples and installed them in the -- (inaudible) -- so that people can have a look at them and then we -- they can examine them. There are plans to purchase a further 2,000 for the Basra and the various other provinces of Iraq. And the -- (inaudible) -- there has been in contact with the administrator of electricity, and I understand the number has been approved, so they're in the process of contracting. So the message is spreading and, hopefully, the use of solar street lighting will increase. And it is primarily because, at the moment, the streets of Baghdad are dark. And Major Smith eloquently put it better than I could do.

As far as the units for the houses, we're at the stage -- we're at the trial stage, no system has been installed. At the moment we're working on a 20-unit to be installed in various parts of Baghdad; and then we want to monitor the performance and make sure that the claims that are made by the companies are justified before we can recommend them and before we can take them a stage further.

And this is the stage we're in at the moment -- we're not at the moment, and we're moving forward in that direction. So it's strictly, at this stage, a trial experiment. And if it succeeds, and I trust that it will, then we can approach the Ministry of Electricity and say to them, this is a good system currently distributed throughout Baghdad.

MS. KYZER: And, Chuck, did you have a question as we close out?

Q Yeah, I did.

This is for the doctor. How much sunlight, on average, makes it worth even considering the photocells? You talked about that they were being used in Europe, so obviously they're in climates where there's a lot more clouds than Iraq. What -- you know, what would be a minimum for consideration, would you say?

MR. ALLAK: Well, at the moment we have approximately eight to 10 hours of sunlight in Baghdad, and it's quite bright sunlight. And I've been here for A year, and A very few days -- regrettably, very few days with cloudy weather. I have to go to the U.K. to experience some rain. And I wish we could bring some of the U.K.'s weather to Iraq.

But, mainly there's a lot of sunlight, and it is almost throughout the year. So it's definitely well worth --

Q Well, doctor, I was kind of headed toward, you know, here -- (audio break) -- I'm looking out my window at the snow and the clouds now here in the United States, I was wondering, you know, in Europe and the United States, what kind of sunlight is -- makes the photocells practical?

MR. ALLAK: The type of intensity -- light intensity.

Q Mm hmm. Well, I mean -- if you have six or seven hours of sunlight, is that a practical amount?

MR. ALLAK: Absolutely. Absolutely. Absolutely, because -- well, with these units, they don't stop making electricity, they just make less electricity because, invariably, sunlight will fall onto them. They just make less electricity than they -- otherwise if you have a bright sunlight.

And the -- once the -- the capability or the designed production rate -- let's, for argument, say that they're using a 200-watt solar panel, that assumes there's full sunlight; that that is the maximum capacity now that -- if it's a cloudy day, then obviously the efficiency of the unit will reduce.

But in Iraq, and the Middle East in particular, we do have a lot of bright sunlight, and so there are -- they're going to work fairly well and they do work very well and they are very efficient in the Middle East. Now, European countries will need to look at their efficiencies when there is cloud, or whatever. But they don't stop working, they just produce less electricity.

Q Okay, thank you.

MR. ALLAK: My pleasure.

MS. KYZER: Great.

And we're right at our time limit here, so thank you everyone for all of your time. Thanks so much to the Corps of Engineers for setting this up.

Again, the transcript and audio file will be available at defenselink.mil/blogger. Thank you from Major Smith, and thank you, Dr. Allak. I know it's a good evening for you all, (laughs) and a good morning for those of us here in this area.

But, thank you so much for your time, and everyone have a great day.

END.